Claims

1. A method for the catalytic reduction of NO_x in an NO_x containing gas using methane in the presence of a catalyst which comprises a palladium-containing zeolite, characterized by using a zeolite based on rings having 12 oxygen atoms, wherein the zeolite also contains scandium, yttrium, a lanthanide or a combination thereof.

2. Method according to Claim 1, wherein the zeolite is loaded with scandium, yttrium, a lanthanide or a combination thereof and optionally other metals after having been loaded with palladium by ion exchange.

3. Method according to one of Claims 1 and 2, wherein the zeolite comprises a zeolite of the class of FAU, MOR, BEA, EMT, CON, BOG or ITQ-7.

4. Method according to Claim 3, wherein the zeolite is MOR.

5. Method according to one of Claims 1-4, wherein the zeolite is loaded with 0.02 to 2% by weight of palladium.

6. Method according to one of Claims 1-5, wherein the zeolite is loaded with scandium, yttrium, a lanthanide or a combination thereof by ion exchange or incipient wetness techniques.

7. Method according to Claim 6, wherein the zeolite comprises 0.01 to 20% by weight of scandium, yttrium, a lanthanide or a combination thereof.

8. Method according to one of Claims 1-5, wherein the zeolite is loaded with scandium, yttrium, a lanthanide or a combination thereof by physically mixing the zeolite with salts or oxides of said metals.

9. Method according to Claim 8, wherein the zeolite is loaded with 0.01 to 50% by weight of scandium, yttrium, a lanthanide or a combination thereof.

10 Method according to one of claims 1-9, wherein the zeolite is loaded with one or more metals from groups IIIa, IIIb, IVa, IVb, Vb, VIb, VIIb, and VIII of the periodic system, in addition to palladium and scandium, yttrium, a lanthanide or a combination thereof.

11. Method according to one of Claims 1-10, wherein the gas also comprises oxygen and/or water.

12. Method according to one of Claims 1-11, wherein the gas also comprises carbon monoxide.

13. Method according to one of Claims 1-12, wherein the reaction temperature is between 300°C and 600°C, and the NO_x/methane ratio is between 0.02 and 2.

14. Method according to one of Claims 1-13, wherein an additional catalyst is used for the removal of N_2O.

15. Method according to Claim 14, wherein the catalyst for the removal of N_2O is an iron-containing zeolite and/or a promoted iron-containing zeolite.

16. Method according to one of Claims 1-15, wherein an additional catalyst is used for the removal of methane.

17. Catalyst which comprises a palladium-containing zeolite, wherein the palladium in the zeolite is wholly or partially coordinated as ion by the zeolite, wherein the zeolite is based on rings of 12 oxygen atoms, and wherein the zeolite is also loaded with scandium, yttrium or a lanthanide or a combination thereof.

18. Catalyst according to Claim 17, characterized by an infra-red sensitive zeolite lattice vibration visible at about 950 cm^{-1}.

19. Catalyst according to Claims 17 or 18, wherein the zeolite is loaded with one or more metals from groups IIIa, IIIb, IVa, IVb, Vb, VIb, VIIb, and VIII of the periodic system, in addition to palladium and scandium, yttrium, a lanthanide or a combination thereof.

20. Method for the preparation of a catalyst which comprises a palladium-containing zeolite based on rings having 12 oxygen atoms and wherein the zeolite also comprises scandium, yttrium or a lanthanide or a combination thereof, wherein the zeolite is loaded with scandium, yttrium, a lanthanide or a combination thereof and optionally other metals after having been loaded with palladium by ion exchange.

21. Method according to Claim 20, wherein the zeolite, after having been loaded with palladium by ion exchange, the zeolite is loaded with one or more metals from groups IIIa, IIIb, IVa, IVb, Vb, VIb, VIIb, and VIII of the periodic system, in addition to palladium and scandium, yttrium, a lanthanide or a combination thereof, before, at the same time or after the introduction of scandium, yttrium or a lanthanide or a combination thereof.